Remote Underwater Characterization System

Idaho National Engineering and Environmental Laboratory

Technology Deployment Summary Sheet

REMOTE UNDERWATER CHARACTERIZATION SYSTEM (RUCS) DEPLOYMENT AT PBF

THE NEED

The Idaho National Engineering and Environmental Laboratory (INEEL) Decontamination and Decommissioning Program has a need for a device to aid in characterization of the Power Burst Facility (PBF) reactor pool and canal areas. The current method for this type of underwater characterization is lowering cameras and radiation detection equipment into the water manually. This method places workers at risk to radiation exposure and fatigue while holding such equipment over the pool area. The Remote Underwater Characterization System (RUCS) eliminates the potential for back strain while reducing radiation exposure to personnel, thus complying with "as low as reasonably achievable" (ALARA) principals.

THE TECHNOLOGY

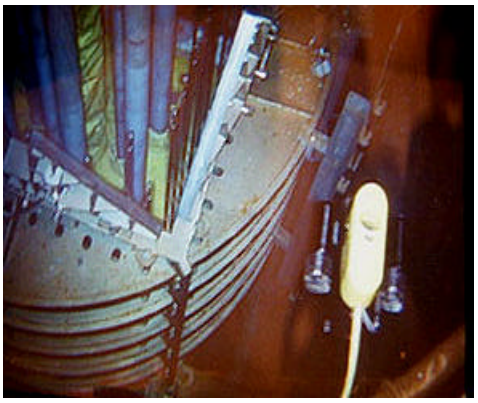
The RUCS is a small, tethered, remotely operated submersible vehicle intended to serve multiple purposes in underwater characterization operations. It is based on the commercially-available "Scallop" vehicle produced by Inuktun Services Ltd., British Columbia Canada, but has been modified by DOE's Robotics Technology Development Program to be more suitable for activities associated with underwater D&D of nuclear facilities. The RUCS is designed to provide underwater visual inspection and gamma radiation characterization, even in confined or limited access areas. It utilizes a forward-looking color camera with tilt control and a GM tube radiation detector to get "real time" radiological and visual information needed to make decisions in performing decontamination and decommissioning of government facilities.

THE DEPLOYMENT

The RUCS was deployed in March 2002 at the Idaho National Engineering and Environmental Laboratory (INEEL) as part of the INEEL Large Scale Demonstration and Deployment Project, funded by DOE's National Energy Technology Laboratory (NETL) for the D&D Focus Area. The deployment took place at the PBF-614 Power Burst Facility reactor pool and fuel transfer canal that contains a defueled test reactor. The RUCS was used to visually survey the reactor and canal and its contents, and to gather radiological characterization data on the reactor and equipment on the floor of the canal.

THE RESULTS

The RUCS was simpler to deploy than the baseline approach of mounting an underwater camera and underwater radiation detector to a cable or a long reach rod. It also reduced the number of personnel dressed in anti-C clothing in the reactor area, which saved labor, reduced waste and reduced the potential for personnel exposure and contamination. Its small size and maneuverability allowed it to operate beneath structures and behind reactor supports and piping, it also measured radiation levels as high as 43R, at a distance of 3 inches away from several objects around the reactor. It should be noted that RUCS is not superior in all instances; the baseline approach provided slightly higher quality video than the RUCS and also provided more lighting than the RUCS. However, the RUCS was able to access areas that the baseline technology could not.



The RUCS inspecting the PBF reactor

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